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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/565,222

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Koji Naniwada

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SONNENSCHN NATH & ROSENTHAL LLP

P.O. BOX 061080

WACKER DRIVE STATION, SEARS TOWER

CHICAGO, IL 60606-1080

EXAMINER

HAMILL, ERIC R

ART UNIT

PAPER NUMBER

2817

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/565,222

Applicant(s)

NANIWADA, KOJI

Examiner

ERIC R. HAMILL

Art Unit

2817

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6 is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-13 is/are rejected.
- 7) ☒ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 January 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)
- Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. Figures 14 and 15 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated (See Applicants specification pages 4-5). See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 2-4 and 10-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2-4 and 10-12 recite the limitation "said support column." It is unclear which one of the "at least one support columns," as recited in claims 1 and 9, respectively, is to be formed at a desired node of oscillation.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 3-5, 9, and 11-13 are being rejected under 35 U.S.C. 102(b) as being anticipated by Nguyen (US Patent No. 6,566,786), of record.

Regarding claims 1 and 9, Nguyen teaches: a communication apparatus including a filter to limit a band of a transmission and/or reception signal (Figs. 5a and 6, Col. 5, lines 40-44), the filter including a MEMS resonator (The "two-resonator" MEMs filter in Fig. 5a, col. 9, lines 5-7) comprising:

a substrate (Fig. 5a, substrate "not shown," Col. 9, line 12);
an electrode (Fig. 5a, electrodes 20, 22, 24, and 26, col. 9, lines 15-20) formed on said substrate (Fig. 5a); and
a beam (resonators 1 and 2 are "beam resonators," col. 9, line 9; Therefore both have a beam supported by the anchors 18) formed on the substrate with said electrode therebetween (In Fig. 5a, electrodes 20, 22, 24, and 26 are all between: the beams of the resonators 1 and 2, and the "not shown" substrate),

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wherein at least one support column (In Fig. 5a, each resonator 1 and 2 has two anchors/support-columns 18, col. 9, line 10, at opposite ends of their respective beams; and these anchors/columns are between the beam and the substrate; furthermore, the beam 19 is also a support column because it is shaped like a column and provides mechanical support and coupling between the beams) is provided between said substrate and said beam.

Regarding claims 3 and 11, Nguyen further teaches a MEMS resonator wherein both upper and lower ends of said support column are integrated with said substrate and said beam (In fig. 5a, both the upper and lower ends of the anchors/columns 18 is in contact/integrated with the substrate and the beam).

Regarding claims 4 and 12, Nguyen further teaches a MEMS resonator wherein said support column (Fig. 5a, beam/support-column 19) is formed such that one end thereof is integrated with said beam and the other end thereof is formed not to contact with said substrate (Fig. 5a).

Regarding claims 5 and 13, Nguyen further teaches a MEMS resonator wherein an input electrode (Fig. 5a, electrode 20, col. 9, line 15) for a high frequency signal (Table 2 shows how to design the resonator in 5a to operate in high frequencies, col. 10, lines 4-30) and an output electrode (Fig. 5a, electrode 24, col. 9, line 17) for a high frequency (Table 2 shows how to design the resonator in 5a to operate in high frequencies) signal constitute the electrode (In claim 1, electrodes 20 and 24 were

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included as “an electrode”).

7. Claims 7-8 are being rejected under 35 U.S.C. 102(b) as being anticipated by Ma (US Pub No 2003/0168929).

Regarding claim 7, Ma teaches a method of manufacturing a MEMS resonator [0026], comprising the steps of:

forming an electrode and support column (Fig. 1 and 2, conductive layer 16 becomes the pedestals/columns 18, the pedestals are also electrodes because they are conductive and connected to the beam/electrode 28, as shown in Fig. 8 [0036]; therefore, the pedestals 18 are support-columns/electrodes) **on a substrate** (Fig. 1 and 2, the substrate comprises layers 10, 12 and 14, [0026]);

forming a layer (Fig. 3, sacrificial oxide layer [0028]) **on said substrate including said electrode and said support column** (Fig. 3);

forming an opening at a portion of said layer that reaches said electrode; (In Fig. 4, exposed upper surfaces 24 are formed on each electrode/pedestal/support-column 18)

forming a beam on said layer and said electrode (Fig. 5, a layer/beam 26, [0030], is formed on the electrodes/pedestals 18; see also fig 7 showing the “beam” after the sacrificial layer 22 has been removed);

and removing said layer such that said beam hangs over said support column providing space therebetween and contacts said electrode (fig 7 shows the “beam” after the sacrificial layer 22 has been removed, [0033]; And there is shown a space between the beam/layer 28 and support-columns/electrodes/pedestals 18; this “space” is

also between the layer 28 and the electrode 20; The beam/layer 28 is also shown contacting the electrode/pedestals 18).

Regarding claim 8, Ma teaches a method of manufacturing a MEMS resonator [0026], comprising the steps of:

forming an electrode (Fig. 1 and 2, conductive layer 16 becomes the pedestals/columns 18 and electrode 20, [0026] ,the pedestals are also electrodes because they are conductive and connected to the beam/electrode 28, as shown in Fig. 8 [0036]; In this case, only the electrode/pedestal 18 *on the left*, will be considered as "an electrode") **on a substrate** (Fig. 1 and 2, the substrate comprises layers 10, 12 and 14, [0026]);

forming a layer (Fig. 3, sacrificial oxide layer [0028]) **on said substrate including said electrode** (Fig. 3);

selectively forming a first opening having a depth not to reach said substrate at a portion of said layer (In Fig. 4 shows a first exposed upper surface 24, on the right) **where a support column can be formed** (Fig. 5 shows layer 26, [0030], which fills in the first exposed upper surface 24, on the right, and creates an unlabeled support column) **and a second opening at another portion of said layer that reaches said electrode** (Fig. 4, exposed upper surface 24, on the left, col. 3, line 35, is formed that reaches the pedestal/electrode 18 *on the left*, see [0026] and [0038]);

forming a beam on said layer and said electrode (Fig. 5, a beam/layer 26 is formed on the sacrificial layer 22 and on the electrode/pedestal 18 on the left, [0030]) **and forming inside said opening the support column integrated with said beam** (Fig. 5 shows layer

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26, [0030], which fills in the first exposed upper surface 24, on the right, and creates an unlabeled support column);

and removing said layer (fig 7 shows the “beam” after the sacrificial layer 22 has been removed, [0033]).

Allowable Subject Matter

8. Claim 6 is allowed. Regarding claim 6, Ma fails to teach a method of manufacturing a MEMS resonator with the step of selectively forming an opening that reaches said substrate at a portion of said layer where a support column is to be formed.

Response to Arguments

9. Applicant's arguments with respect to claims 1, 3, 5, 9, 11, and 13 is that Nguyen fails to teach a beam formed over electrodes and a support column provided between the substrate and the beam.

However, Fig. 5a clearly shows resonators 1 and 2, which are “beam resonators,” col. 9, line 9. Each resonator has a beam, supported by anchors 18 which are formed on the substrate, and includes electrodes 20, 22, 24, and 26 between the substrate and the beam resonators 1 and 2.

With regards to the support columns, Fig. 5a also teaches resonators 1 and 2 each having two anchors/support-columns 18, col. 9, line 10, at opposite ends of their respective beams. And these anchors/columns are between the

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beam and the substrate, col. 9, lines 7-12. Furthermore, beam 19 is also a support column because it is shaped like a column and provides mechanical support and coupling between the beams.

Applicant's arguments with respect to claims 7 and 8 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Any response to this Office Action should be **faxed** to (571) 273-8300 or **mailed** to:

Commissioner for Patents,
P.O. Box 1450
Alexandria, VA 22313-1450

Hand-Delivered responses should be brought to

Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Hamill, whose telephone number is (571) 270-1802. The examiner can normally be reached Mon-Fri from 7:30-5:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal, can be reached at (571) 272-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR. Status information for unpublished application is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have question on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eric Hamill

Patent Examiner Art Unit 2817

**/BENNY LEE/
PRIMARY EXAMINER
ART UNIT 2817**